CLAIMS

1. A system for generating a frequency weighting (FW) matrix for use in a Fine-Granularity-Scalability (FGS) video coding system, comprising:

a system for generating average discrete cosine transform (DCT) residuals for a sample video frame encoded both at a predetermined base layer bit-rate and at approximately three times the predetermined base layer bit-rate;

a system for plotting a difference curve of the generated average DCT residuals, wherein the difference curve is plotted by DCT coefficient locations corresponding to a DCT zigzag scan line; and

a system for matching a staircase curve to the difference curve.

2. The system of claim 1, wherein values on the staircase curve at each DCT coefficient location are mapped into the FW matrix at locations corresponding to the DCT zigzag scan line.

3. The system of claim 2, further comprising a weight adjustment system [21] for altering the staircase curve when the weights determined from the staircase curve are larger than an upper limit of a number of bit planes in the FGS video coding system.

4. The system of claim 1, wherein the sample video frame is selected from a sample video sequence having a predetermined scene characteristic.

5. The system of claim 4, wherein the predetermined scene characteristic comprises a criterion selected from a group consisting of: a brightness level, a motion level, and an activity level.

6. The system of claim 1, wherein the predetermined base layer bit-rate is application, resolution, and frame rate dependent.

7. A method of generating a frequency weighting (FW) matrix for use in a Fine-Granularity-Scalability (FGS) video coding system, comprising the steps of:

generating a first plot of average discrete cosine transform (DCT) residuals versus a zigzag DCT scan line location for a sample video frame encoded at a first bit-rate;

generating a second plot of average discrete cosine transform (DCT) residuals versus the zigzag DCT scan line location for the sample video frame encoded at a multiple of the first bit-rate;

generating a difference curve of the first and second plot;

matching a staircase curve to the difference curve; and

mapping weights from the staircase curve to populate the FW matrix.

8. The method of claim 7, wherein the first bit-rate comprises a base layer bit-rate.

9. The method of claim 8, wherein the multiple comprises three times the base layer bit-rate.

10. The method of claim 7, comprising the further step of normalizing the staircase curve when the mapped weights determined from the staircase curve are larger than an upper limit of a number of bit planes in the FGS video coding system.

11. The method of claim 7, wherein the sample video frame is selected from a sample video sequence having a predetermined scene characteristic.

12. A Fine-Granularity-Scalability (FGS) video encoding system that utilizes a frequency weighting (FW) matrix to encode video data, comprising:

a system for determining a scene characteristic of the video data; and

a system for selecting an FW matrix from a plurality of FW matrices based on the determined scene characteristic.

13. The FGS video encoding system of claim 12, wherein each of the plurality of FW matrices are associated with one of a plurality of predetermined scene characteristics.

14. The FGS video encoding system of claim 13, wherein weights for each matrix are determined from a staircase curve match of the average discrete cosine transform (DCT) residuals calculated at a first and second critical quality bit-rate for a sample video frame.

15. The FGS video encoding system of claim 14, wherein the first and second critical quality bit-rates comprise a base layer bit-rate and three times the base layer bit-rate.

16. The FGS video encoding system of claim 14, wherein the sample video frame was derived from a video sequence having one of the plurality of predetermined scene characteristics.

17. The FGS video encoding system of claim 12, wherein the determined scene characteristic comprises a criterion selected from a group consisting of: a brightness level, a motion amount, and an activity level.

18. A program product stored on a recordable medium for generating a frequency weighting (FW) matrix for use in a Fine-Granularity-Scalability (FGS) video coding system, the program product comprising:

means for generating a first plot of average discrete cosine transform (DCT) residuals versus zigzag DCT scan line locations for a sample video frame encoded at a first bit-rate;

means for generating a second plot of average discrete cosine transform (DCT) residuals versus zigzag DCT scan line locations for the sample video frame encoded at a multiple of the first bit-rate;

means for generating a difference curve of the first and second plot;

means for matching a staircase curve to the difference curve; and

means for populating the FW matrix with weights mapped from the staircase curve.

19. The program product of claim 18, wherein the first bit-rate comprises a base layer bit-rate, and wherein the multiple comprises three times the base layer bit-rate.

20. The program product of claim 18, further comprising means for normalizing the staircase curve when the weights determined from the staircase curve are larger than an upper limit of a number of bit planes in the FGS coding system.

21. A Fine-Granularity-Scalability (FGS) video decoding system that utilizes a frequency weighting (FW) matrix to decode encoded video data, wherein weights for the FW matrix are determined from a staircase curve match of the difference of the average discrete cosine transform (DCT) residuals calculated at a base layer bit-rate and approximately three times the base layer bit-rate for a sample video frame.

22. The FGS video decoding system of claim 21, further comprising a system for adaptively changing the FW matrix when a scene characteristic changes.